CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2008-XXXX

WASTE DISCHARGE REQUIREMENTS
ISSUED TO
THE U.S. DEPARTMENT OF ENERGY
AND
LAWRENCE LIVERMORE NATIONAL SECURITY, LLC
FOR
LAWRENCE LIVERMORE NATIONAL LABORATORY
EXPERIMENTAL TEST SITE (SITE 300)

SEWAGE EVAPORATION AND PERCOLATION PONDS
SEPTIC SYSTEMS
COOLING TOWER DISCHARGES
MECHANICAL EQUIPMENT WASTEWATER DISCHARGES
AND
OTHER LOW-THREAT DISCHARGES

ALAMEDA AND SAN JOAQUIN COUNTIES

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board) finds that:

DESCRIPTION OF SITE

1. Lawrence Livermore National Laboratory Experimental Test Site (Site 300), occupies 10.4 square miles in the Altamont Hills of the Diablo Range, in T3S, R4E, MDB&M, most of which is in San Joaquin County. The western one-sixth of the site is in Alameda County. Site 300 is approximately 8.5 miles southwest of downtown Tracy and 17 miles southeast of Livermore, as shown on Attachment 1, a part of this Order.

2. Site 300 is owned by the United States Government and operated by Lawrence Livermore National Security, LLC, (hereafter jointly referred to as Discharger).

3. Site 300 was placed on the National Priorities List in 1990. Ongoing work to characterize and remediate contaminant release sites is conducted under the Comprehensive Environmental Response Compensation Liability Act (CERCLA) and a Federal Facilities Agreement. This work is supervised by Remedial Project Managers from the Regional Water Board, the California Department of Toxic Substances Control, the U.S. Environmental Protection Agency, and the U.S. Department of Energy. Discharges regulated by this

order may occur within areas under investigation or remediation by the CERCLA project.

4. The general layout of the site, including the locations of the discharges covered in this permit, is shown on Attachment 2, a part of this Order.

5. The hydrogeologic units first encountered under discharge areas and depths to these units vary across the site and are controlled by geologic structures, elevation and depositional environments. A simplified cross-section with the stratigraphy and hydrologic characteristics at Site 300 is shown on Attachment 3, a part of this Order. Depth to groundwater varies across the site and ranges below the discharge areas from approximately 10 feet to 230 feet below ground surface (bgs).

BACKGROUND

6. On 20 September 1996 the Regional Water Board adopted WDR Order No. 96-248 prescribing requirements for:

   a) The discharge of domestic and mechanical equipment wastewater to sewage evaporation and percolation ponds (hereafter collectively referred to as sewage ponds).
   b) The discharge of mechanical equipment wastewater to percolation pits.
   c) Discharges to Class II surface impoundments that were used for disposal of explosives processing wastewater and photographic rinse water.

7. In addition to the discharges to land, the Discharger had low threat discharges and discharges from cooling towers at Buildings 801, 836A and 865 to surface water. These discharges were permitted under NPDES Permit No. CA0081396, WDR Order No. 94-131. Discharge from the cooling tower at Building 865 was discontinued in 1995.

8. The Discharger installed new waste disposal systems to eliminate discharge to surface waters. The Discharger evaluated wastewater disposal systems for cooling towers and mechanical equipment and proposed and installed, with Regional Water Board concurrence, percolation pits to engineer discharges from mechanical equipment and cooling towers to the subsurface. Between 1991 and 2005, the Discharger eliminated and/or replaced water-based cooling tower systems with air-cooled systems, thereby eliminating nineteen cooling tower discharges.

9. In a letter dated 22 May 2000, the Discharger notified the Regional Water Board that it had determined that the discharges from the cooling towers at 801 and 836A and other low-threat discharges included in the NPDES permit, listed in Attachment 4, a part of this Order, percolate into the ground and do

not reach surface water and therefore did not need to be included in the NPDES permit. Regional Water Board staff concurred with this determination. Discharge from the cooling tower at Building 836A has since been discontinued and discharge from the cooling tower at Building 801 is now directed to a percolation pit. On 4 August 2000, the Regional Water Board rescinded the Discharger's NPDES permit, Order No. 94-131.

10. Lawrence Livermore National Laboratory submitted a Report of Waste Discharge (RWD), dated 19 July 2000, to amend Order No. 96-248 to include:

    a) Discharges to sewage evaporation and percolation ponds.
    b) Mechanical equipment room wastewater discharges to percolation pits.
    c) Cooling tower blowdown and discharges associated with cooling tower maintenance to percolation pits.
    d) Septic system discharges to septic tanks, leach fields, and cesspools.
    e) Low threat discharges to ground: primarily low volumes of drinking water, condensates, and uncontaminated contained rainwater that are detailed in Attachment 4, which is attached hereto and made part of this Order.

11. This Order includes the discharges listed in Finding 10 and removes discharges to the Class II Surface Impoundments, which LLNL clean closed in compliance with Title 27 requirements. Closure was completed on 3 November 2005, and the final Clean Closure Report for the Class II Surface Impoundments was submitted on 22 February 2006.

12. On 28 January 2005, in response to a request from the Regional Water Board, the Discharger submitted a technical report containing the analytical results of:

    a) Representative samples of the wastewater discharges from cooling towers and mechanical equipment to septic systems, percolation pits, and sewage ponds.
    b) Samples from sewage pond influent and the sewage pond.
    c) Groundwater samples from monitoring wells upgradient and downgradient of the sewage ponds.

    The analytical results are included in Attachments 5, 6, 7, 9, 10, 11, 12, 13, 14, 18, 19 and 20, a part of this Order.

13. The report also contained descriptions of the percolation pits and the septic systems across the site, locations of monitoring wells with respect to septic systems, and results of an analysis of threat to groundwater from septic systems and percolation pits discharges based on the designated level methodology. The Discharger conducted the designated level methodology analysis to evaluate the potential threat to beneficial uses of groundwater

from constituents in mechanical equipment and cooling tower discharges. The Discharger applied an attenuation factor for all constituents likely to be discharged to percolation pits and septic systems, except trihalomethanes. The Regional Water Board has since determined that because salts (as represented by measured specific conductance values, and sulfate, total dissolved solids, sodium, chloride, and nitrate concentrations) do not fully attenuate as they move through the soils, the Discharger will need to re-evaluate the potential for discharges of these salts to degrade groundwater. The Monitoring and Reporting Program (MRP) (No. R5-2008-XXXX) included with this Order requires the Discharger to conduct additional monitoring of wastewater effluent for salts and metals in cooling tower and mechanical equipment effluent.

14. This Order also requires the Discharger to conduct studies and modeling to determine appropriate attenuation factors for salts and re-evaluate whether the discharges of salts and metals are degrading or have the potential to degrade groundwater. If the studies or modeling identify any discharges with the potential to degrade groundwater, the Regional Water Board will require that the Discharger monitor the groundwater near those discharges, which may require the installation of new monitoring wells. If groundwater degradation is confirmed, the Regional Water Board will require the Discharger to evaluate and conduct source control, and if beneficial uses of groundwater have been degraded, to prepare a feasibility study proposing groundwater remediation.

PREVIOUS ANALYSIS OF GROUNDWATER IMPACTS

15. Site 300 conducts extensive monitoring of groundwater in connection with the CERCLA project. Some of the septic systems are within areas undergoing remedial investigation or areas where cleanup remedies have been selected and are being implemented.

16. CERCLA-conducted monitoring near septic systems at Buildings 812, 834, 850, and 899 have shown concentrations of nitrate above the maximum contaminant level (MCL). The septic systems at these four locations are within 30 feet of groundwater. In each of these areas nitrate is also a constituent of concern in the CERCLA investigation but, according to studies conducted by LLNL staff, the groundwater nitrate concentrations cannot be completely explained by CERLCA-related releases.

17. Nitrate is a groundwater constituent that may result from natural and anthropogenic sources. The CERCLA investigations have identified both natural and anthropogenic sources of nitrate at Site 300 including the geology, historic releases associated with explosive compounds, and septic systems. Multiple independent data sets, including nitrogen and oxygen

isotopes of nitrate and excess dissolved nitrogen, indicate that nitrate is naturally denitrifying in the confined regions of the bedrock aquifers at Site 300.

18. CERCLA investigation and/or remediation occurring in areas where the Discharger has determined that septic systems may be impacting groundwater are:

    a) Building 812 – Remedial Investigation/Feasibility Study and pilot study for treatment of uranium, volatile organic compounds (VOCs), explosive compounds, nitrate and perchlorate.
    b) Building 834 – Active remediation for VOCs and diesel, treated nitrate-bearing groundwater is misted to the air.
    c) Building 850 – Pilot study targeting perchlorate remediation, which will denitrify nitrate as an added benefit.
    d) Building 899 – Monitored natural attenuation for TCE, perchlorate, tritium and nitrate. Nitrate concentrations above the MCL are limited to one well which is in the vicinity of the septic system leach field.

19. Site 300 operates a nontransient, noncommunity drinking water system under a permit issued by the California Department of Public Health. Groundwater is pumped from two-onsite supply wells (Well 20 [primary] and Well18 [backup]). Well 20 is screened between 425 and 475 feet bgs and Well 18 is screened between 387 and 517 feet bgs. Both are screened in the regional aquifer, the Tertiary Neroly Lower Blue Sandstone ($Tnbs_1$). The water is chlorinated in the distribution system and is monitored to assure that drinking water standards are met. Analyses of nitrate concentrations in the groundwater from these wells consistently have been below the detection limit for nitrate of 0.5 mg/L, indicating that natural and anthropogenic nitrate sources are not degrading the regional aquifer.

20. Regional Water Board staff concludes that some localized degradation of groundwater from the nitrate associated with domestic waste in septic system discharges has occurred in the past and may still be occurring. Issuance of this Order and the associated MRP provides a means to monitor the impacts that the septic systems may have caused to groundwater, and will help the Regional Water Board ascertain whether continued use of these systems will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the State Water Board's policies.

21. The Water Quality Control Plan, Central Valley Region, Fourth Edition (Basin Plan) designates the beneficial uses of groundwater underlying Site 300 as municipal and domestic, agricultural, and industrial supply. The property is not conducive to growing of crops. The most likely agricultural beneficial use would be livestock watering.

DESCRIPTION OF WASTES AND WASTE UNITS

Sewage Evaporation and Percolation Ponds - Domestic and Industrial Waste Ponds

22. The location of the sewage evaporation and percolation ponds is shown on Attachment 2. The sewage evaporation pond discharges to the percolation pond when the capacity of the sewage evaporation pond is exceeded.

23. The sewage evaporation pond receives domestic and mechanical equipment wastewater from Buildings 870, 871, 872, 873, 874, 875, 876, 877, 878, 879 and 880. Domestic wastewater generated at these Site 300 buildings includes discharges of sanitary wastes from restroom and shower facilities, washing machines, kitchens, and housekeeping activities. Mechanical equipment wastewater discharges generated at these facilities include discharges from boilers, vacuum pumps, pressure relief valves on hot water/steam equipment, humidifiers, filter drains, and water softeners, as well as condensate from air compressors, air conditioners, and refrigeration units. The Discharger sampled and analyzed wastewater discharges from mechanical equipment in the Buildings 806 and the 827 Complex. Because the sources of the wastewater at these buildings are similar to those which discharge to the sewage evaporation pond, the analytical results were determined to be representative of mechanical equipment discharges to the sewage evaporation pond. Attachments 5 and 6 show analytical results from the mechanical equipment discharges. The Discharger also analyzed washing machine effluent from Building 873. Attachment 7 shows the analytical results from the washing machine. The results on Attachments 5 and 6 show that the discharge to the sewage pond has the potential to degrade groundwater if overflow from the sewage evaporation pond to the sewage percolation pond occurs.

24. The sewage ponds are underlain by approximately 35 feet of Quaternary alluvium that consists of clay, silt, sand, and gravel lenses. The alluvium overlies the regional aquifer, the $Tnbs_1$. The alluvium and $Tnbs_1$ are in hydraulic communication.

25. The seasonally highest groundwater level in the alluvium ranges from 10 feet below to even with the base of the sewage ponds. Groundwater flows generally in a northeasterly direction along alluvial paleochannels of Corral Hollow Creek and to the southeast in the $Tnbs_1$.

26. Land within 1,000 feet of the sewage ponds off Site 300 property is used primarily for livestock grazing. One residence is within 1,000 feet of the sewage ponds on the property previously operated as a fire station by the

California Department of Forestry. Water supply for this residence is from wells completed in the $Tnbs_1$. Land within 1,000 feet of the sewage ponds within Site 300 is primarily open space, groundwater treatment facilities, and facility maintenance shops and offices.

27. The sewage evaporation pond is lined with catalytically-blown asphalt and is designed to overflow to the sewage percolation pond during periods of high rainfall. The surface area of the sewage evaporation pond is approximately one acre and the surface area of the percolation pond is approximately 0.33 acres. The sewage evaporation pond has a depth of 6.5 feet at the deepest point and four feet near the edges. The Discharger aerates the sewage evaporation pond for odor control as needed.

28. Design capacity of the sewage evaporation pond is 250 people per day at 30 gallons per day (gpd) per person. The sewage evaporation pond receives approximately 4,000 gpd of wastewater. Normal usage is lower than the design capacity. Due to the low flow (less than 10 gallons per minute during the work day), monitoring flow is not practical and no flow meter is installed.

29. The Discharger has only needed to remove sludge from the sewage ponds once since beginning operation. The Discharger sampled the sludge to characterize it for disposal. The sludge was determined to be non-hazardous and was disposed at the Class III BFI Landfill off Vasco Road in Livermore. Future sludge removal would be handled in the same manner. Four metals in the sludge, copper, mercury, silver and zinc, exceed Site 300 soil background levels for these metals. Annual groundwater sampling for metals is required in this Order.

30. The Discharger has registered the sewage percolation pond as a Class V Injection Well with the United States Environmental Protection Agency (US EPA).

31. In March 1997, the Discharger submitted a *100-year Storm Event Study for the Site 300 Sanitary Sewer Ponds* (1997 Study) evaluating the capacity of the system to contain the 100-year precipitation event. The 1997 Study evaluated the maximum flow into the sewage evaporation and percolation ponds, the 100-year precipitation, infiltration and exfiltration, and percolation and concluded that the sewage ponds can hold the maximum discharge and the influx from a 100-year storm event.

32. To augment the 1997 Study, in 2005 the Discharger submitted a water balance evaluation to account for the evaporation from the system. The 2005 evaluation concluded that the evaporation potential is greater than the amount of water entering the sewage evaporation pond; approximately 75% of the flow into the sewage evaporation pond is lost to evaporation annually.

During the winter months of December through March, the evaporation decreases and flows to the percolation pond may occur

33. The Order preceding Order No. 96-248 did not have freeboard requirements. For 10 years prior to issuance of Order No. 96-248, the Discharger operated the sewage evaporation pond with one foot of freeboard without incident of structural problems or wave action washing over the berm. Since depth to groundwater varies between zero and 10 feet below the base of the sewage ponds, overflow to the percolation pond has the potential to degrade groundwater.

34. This Order requires the Discharger to maintain adequate freeboard in the sewage evaporation pond to prevent over-topping or erosion of the pond embankment which may threaten the integrity of the pond. The Discharger will maintain the minimum freeboard determined as adequate to reduce or eliminate the overflow frequency to the percolation pond during winter months. Removable boards control flow into the spillway to the percolation pond and maintain freeboard depth.

35. This Order requires the Discharger to monitor quarterly the wastewater entering the sewage evaporation pond for specific conductance (SC), pH and biochemical oxygen demand (BOD) and the wastewater in the sewage evaporation pond for pH, SC, dissolved oxygen (DO), (BOD), total and fecal coliform and metals. Any discharge from the sewage evaporation pond to the sewage percolation pond is sampled and analyzed for DO, BOD, SC, total and fecal coliform, pH and metals. The Discharger also monitors groundwater downgradient and upgradient of the sewage ponds semi-annually for pH, SC, fecal and total coliform, chloride, nitrate, sulfate, sodium, total dissolved solids (TDS), metals and groundwater elevation. Sewage pond and groundwater sampling locations are shown on Attachment 8, a part of this Order. Results of routine monitoring of evaporation sewage pond influent and in-pond samples are show in Attachment 9, of percolation sewage pond influent are shown on Attachment 10, and for groundwater on Attachment 11. Attachments 12, 13, and 14 provide additional water quality monitoring results of sewage evaporation pond influent (cation/anion scan with ion balance, dissolved metals, and nutrients and coliform organisms) collected to support renewal of the WDRs.

36. This Order continues the existing groundwater monitoring program with the addition of two downgradient monitoring wells and analyses for chloride, sulfate, TDS, sodium and metals to the groundwater monitoring program for the sewage ponds. The added constituents were found to be elevated in mechanical equipment discharges and in sewage sludge.

37. During the summer, evaporation from the sewage evaporation pond exceeds the influent flow to the sewage evaporation pond. In order for the sewage evaporation pond to function properly, the Discharger supplements the influent with groundwater from the on-site supply Well 20, when necessary. Under the CERCLA project, in 2005 the Discharger achieved the groundwater cleanup standard for VOCs in the eastern General Services Area (EGSA) and subsequently shut down the groundwater treatment system. The Discharger is required to continue groundwater monitoring to determine if the VOC concentrations increase or "rebound". Should rebound occur, additional treatment may be required under the CERCLA project. If additional groundwater treatment becomes necessary in the EGSA, the Discharger has the option of discharging a portion of the treated groundwater from the EGSA treatment facility to the sewage evaporation pond when water is needed to make up for excessive evaporative losses during the summer. Approximately 1,000 to 1,500 gpd of treated groundwater could be discharged into the sewage evaporation pond during the summer months.

Mechanical Equipment Wastewater Percolation Pits

38. The five mechanical equipment wastewater percolation pits receive mechanical equipment wastewater from Buildings 806A, 827A, 827C, 827D, and 827E, which are in the High Explosives Process Area and Chemistry Area in the southeast area of the site. The buildings that have mechanical equipment percolation pits are shown on Attachment 2. The percolation pits are approximately 50 to 200 feet from the buildings. Mechanical equipment wastewater includes discharges from boilers, vacuum pumps, pressure relief valves on hot water/steam equipment, humidifiers, filter drains, and water softeners, as well as condensates from air compressors, air conditioners, and refrigeration units. Maximum discharge to the mechanical equipment wastewater percolation pits is 150 gpd each for Buildings 827A, C, D and E and 50 gpd for Building 806A.

39. The High Explosives Process Area and Chemistry Area are underlain by an unsaturated zone ranging from 50 to over 130 feet thick, which consists of interbedded claystone, siltstone and sandstone. Attachment 15, a part of this Order, provides a summary of the percolation pits, waste streams, up and down-gradient monitoring wells and depths to first water-bearing zones. Additional wells may be identified as up and downgradient monitoring wells after the required studies are completed, as described in Provision 5 and discussed in Finding 46.

40. The average hydraulic conductivity of the $Tnbs_2$ is 0.001 cm/sec and the hydraulic gradient is 0.05 to the south-southeast.

41. Land within 1,000 feet of Buildings 806 and 827 A through E is used by Site 300 as open space and for other buildings used for explosives formulation, processing, and storage.

42. The mechanical equipment wastewater percolation pits, constructed in 1995, are rectangular excavations (ranging from 4x3x3 to 7x6x6 feet) filled with drain rock over which is a geotextile filter fabric and a concrete cap. The design flow rate of each of the percolation pits at Buildings 827 A, C, D, and E is 150 gpd and at Building 806 is 50 gpd.

43. The Discharger has registered the mechanical equipment wastewater percolation pits as Class V Injection Wells with the US EPA.

44. At the request of the Regional Water Board, the Discharger submitted technical reports on the quality of the mechanical equipment wastewater in 1994 and in 2005. In 1994 and 2004, the Discharger analyzed the wastewater for analytes suspected to be in the wastewater. In 1994, the analyses included general minerals, VOCs, oil and grease, and metals. In 2004, the analyses included general minerals, oil and grease and metals, as shown on Attachments 5 and 6. VOCs were not analyzed in 2004 because they were not detected in 1994.

45. The Discharger used the Designated Level Methodology (DLM) to evaluate the potential for the mechanical equipment wastewater discharged to percolation pits to impact beneficial uses of underlying groundwater. The lowest appropriate water quality limits protective of beneficial uses of groundwater were selected for the model endpoints. By applying an attenuation factor of 100 for areas where groundwater is greater than 30 feet bgs, the Discharger determined that all constituents detected in the mechanical equipment discharges were lower than the DLM value, indicating the discharges are not predicted to negatively affect groundwater. However, the Regional Water Board has since concluded that salts do not attenuate; therefore, an attenuation factor of one (1) should be applied for salts. In response to this conclusion, the results of the Discharger's analyses reported in the 28 January 2005 report were revised to reflect an attenuation factor of 1 for salts as shown on Attachment 16, a part of this Order. Concentrations of conductivity (measured as SC), sulfate, sodium, and TDS in the mechanical equipment effluent exceed water quality goals. Concentrations of chloride were elevated as well and have the potential to exceed the water quality goal. Concentrations of these five constituents in groundwater vary throughout the site and vary in the different hydrostratigrahic units. Concentrations observed in existing monitor wells upgradient of the percolation pits range from just below to significantly above the water quality goals (see Attachment 17, a part of this Order).

46. For discharges of mechanical equipment effluent, this Order requires the Discharger to conduct a salinity evaluation and minimization plan; requires the Discharger to obtain additional effluent information; requires the Discharger to evaluate fate and transport of salt and metals to ground water; and requires the Discharger to develop additional information on salinity in the source water and receiving water. If any mechanical equipment discharges to percolation pits have degraded groundwater, the Discharger will be required to monitor groundwater up and downgradient of those discharges and submit a feasibility study proposing remedial alternatives to restore beneficial uses of groundwater if it is determined by the Regional Water Board that the groundwater has been unreasonably degraded. The Discharger must include a proposal for implementing a source control program and best practicable technology (BPT) to reduce pollutants in the discharge.

47. This Order also requires the Discharger to monitor semi-annually wastewater discharged to each mechanical equipment percolation pit as described in MRP No. R5-2008-XXXX.

Cooling Tower Percolation Pits

48. Nine non-contact cooling towers, one each at Buildings 801, 809, 812, 817A, 826, two at 827A, and two at 851, discharge blowdown to seven percolation pits, one at each building. Maximum design discharge to these percolation pits ranges from 300 to 1,200 gpd. Attachment 15 provides a summary of the location and design of the percolation pits, nearby wells, depth to groundwater and groundwater flow direction. Additional wells may be identified as down and upgradient monitoring wells after the required studies are completed, as described in Provision 5 and discussed in Finding 56.

49. Occasionally these cooling towers may discharge onto the ground when the percolation pits undergo maintenance. These discharges are of short duration, usually no more than seven days, and the Discharger takes steps to minimize flow and prevent the blowdown from reaching surface water drainage courses.

50. All but three of the existing cooling tower percolation pits are in the High Explosives Process Area and Chemistry Area, described in Finding 39. The three cooling tower percolation pits outside these two areas receive blowdown from cooling towers at the Buildings 801 Complex, 812 Complex and 851 Complex. These buildings are used for testing of explosives. Building 801 and 812 are located in Elk Creek Ravine in the East Firing Area. Groundwater is approximately 50 feet bgs at Building 801 and about 30 feet bgs at Building 812. Building 851 is in the West Firing Area near the San Joaquin/Alameda County line. Groundwater below Building 851 is greater than 120 feet bgs. Land use within 1,000 feet of these building complexes is

open space and explosive storage facilities. Locations of the buildings with percolation pits are shown on Attachment 2.

51. The cooling tower percolation pits are rectangular excavations (ranging from 6x6x3 to 18x18x5 feet) filled with drain rock covered by a concrete cap. These percolation pits were constructed in 1994. Because the cooling tower percolation pit at Building 827 had a recurring overflow problem, it was reconstructed in a new location in March 2001.

52. The Discharger has registered the cooling tower percolation pits as Class V Injection Wells with the U.S. Environmental Protection Agency.

53. Currently, NALCO TRASAR 23246 is added to the cooling towers for corrosion control. The MSDS sheet indicates that this substance contains carbon, nitrate and phosphorus.

54. The Discharger analyzed the blowdown from the cooling towers at Buildings 801, 827A and 836A for analytes suspected to be in the blowdown. (The cooling tower discharge at Building 836A was discontinued on 13 April 2005.) The analyses included volatile organic compounds (VOCs), general minerals, and metals, as shown in Attachments 18, 19 and 20 respectively. The VOCs detected are trihalomethanes resulting from the breakdown of the corrosion and microbiocide additives.

55. The Discharger used the DLM to evaluate the potential for constituents, except VOCs, in cooling tower effluent to impact beneficial uses of underlying groundwater. The lowest appropriate water quality limits protective of beneficial uses of groundwater were selected for the model endpoints. By applying an attenuation factor of 10 for areas where groundwater is less than or equal to 30 feet bgs and an attenuation factor of 100 for areas where groundwater is greater than 30 feet bgs, the Discharger determined that all constituents detected in the cooling tower blowdown were lower than the DLM value, indicating the discharges are not predicted to negatively affect groundwater. However, the Regional Water Board has since concluded that salts do not attenuate; therefore, an attenuation factor of one (1) should be applied for salts. In response to this conclusion, the results of the Discharger's analyses reported in the 28 January 2005 report were revised to reflect an attenuation factor of 1 for salts as shown on Attachments 16 and 21, parts of this Order. Concentrations of conductivity (measured as SC), sulfate, sodium, and TDS in the cooling tower effluent exceed water quality goals. Concentrations of chloride were elevated as well and have the potential to exceed the water quality goal. Background concentrations of these five constituents in groundwater vary throughout the site and vary in the different hydrostratigrahic units. Concentrations observed in existing monitor

wells upgradient of the percolation pits range from just below to significantly above the water quality goals (see Attachment 17).

56. For discharges of cooling tower effluent, this Order requires the Discharger to conduct a salinity evaluation and minimization plan; requires the Discharger to obtain additional effluent information; requires the Discharger to evaluate fate and transport of salt to ground water; and requires the Discharger to develop additional information on salinity in the source water and receiving water. If any cooling tower discharges to percolation pits have degraded groundwater, the Discharger will be required to monitor groundwater up and downgradient of those discharges and submit a feasibility study proposing remedial alternatives to restore beneficial uses of groundwater if it is determined by the Regional Water Board that the groundwater has been unreasonably degraded. The Discharger must include a proposal for implementing a source control program and best practicable technology (BPT) to reduce pollutants in the discharge.

57. This Order also requires the Discharger to monitor semi-annually wastewater discharged to each cooling tower percolation pit as described in MRP No. R5-2008-XXXX.

Septic Systems

58. Thirty-three (33) facilities, which are remotely located throughout the site, have septic systems. These septic systems are located at Buildings 801, 802, 805, 806, 807, 809, 810, 812, 813, 817, 818, 819, 825, 826, 827, 830, 832, 833/835, 834, 836, 841, 848, 850, 851, 854, 855A, 858, 865, 882, 892, 895, 897, and 899 as shown on Attachment 2.

59. The geology and hydrogeology vary across the site and are described in the April 1994 *Final Site-Wide Remedial Investigation*. Land use within 1,000 feet of the septic systems is within Site 300 with two exceptions. Within Site 300 the land uses include open space and buildings used for offices, research, and explosives storage, processing and testing. The septic systems at Buildings 834 and 899 are within 1,000 feet of the site boundary. Offsite land uses within 1,000 feet of these two buildings include off-road vehicle recreation, park ranger housing and livestock grazing on neighboring properties.

60. Septic systems used at Site 300 have been constructed over the 52-year life of the facility and vary in design and capacity. Flows to the septic systems at Site 300 are estimated to range from under 10 to just over 300 gpd, which is lower than typical residential flows. Attachment 22, a part of this Order, provides a summary of the Site 300 septic systems design and waste streams.

61. The Discharger has registered all the septic systems to which mechanical equipment wastewater or cooling tower blowdown is discharged as Class V Injection Wells with the USEPA. None of the purely domestic waste septic systems at Site 300 serve more than 20 people so are not considered Class V Injection Wells.

62. Domestic waste is discharged to all of the septic systems. Domestic waste includes discharges of sanitary wastes from restroom and shower facilities, washing machines, kitchens, and housekeeping activities. Mechanical equipment and cooling tower wastewater is discharged to 12 septic systems at Buildings 801, 802, 805, 813, 819, 825, 826, 830, 833/835, 834A, 850, and 851. Mechanical equipment wastewater may include discharges from boilers, vacuum pumps, pressure relief valves on hot water/steam equipment, humidifiers, filter drains, and water softeners, as well as condensates from air compressors, air conditioners, and refrigeration units.

63. The Discharger analyzed mechanical equipment wastewater from the Building 827 Complex and Building 806, and cooling tower blowdown from Buildings 801, 827A, and 836A. Although these specific sources are discharged to percolation pits, they were considered representative of the mechanical equipment and cooling tower discharges to septic systems at Site 300. (See Attachments 5, 6, 18, 19, and 20.).

64. The septic systems at Buildings 813 and 835 receive discharge from washing machines. Clothing from High Explosives Process Area workers is washed in the washing machine at Building 813. The Discharger analyzed the washing machine effluent at these buildings for general minerals, and at Building 813 only, for explosive compounds, as shown in Attachment 7 and Attachment 23, a part of this Order.

65. The Discharger evaluated threat to water quality from laundry water discharges using the DLM. By applying an attenuation factor of 100 for areas where groundwater is greater than 30 feet bgs, the Discharger determined that all constituents detected in the laundry effluent were lower than the DLM values, except for aluminum and iron. Wastewater from Building 813 machine had detections of RDX and HMX lower than the DLM value. The Regional Water Board has since concluded that salts do not attenuate so an attenuation factor of one (1) should be applied for salts. In response to this conclusion, the results of the Dischargers' analyses reported in the 28 January 2005 report were revised to reflect an attenuation factor of 1 for salts, as shown on Attachment 24, a part of this Order. Concentrations of conductivity (measured as SC), sodium, and TDS in the laundry effluent exceed water quality goals. The study discussed in Finding 69 will evaluate if

any constituents in septic system effluent have the potential to degrade or have degraded groundwater.

66. The septic systems at Site 300 have limited flow, and some are used intermittently. Only six are within 30 feet of groundwater. The septic systems are in remote locations across the site. Connecting to treatment and sewer systems is not practicable. Allowing discharge to these septic systems without secondary treatment is practicable because the septic systems are in remote areas, they have limited use, groundwater is greater than 30 feet bgs at all but six of the septic systems, groundwater below the septic systems is not used for animal or human consumption, and in most cases has limited yield.

67. The groundwater underlying the septic systems is not used on site for livestock or human consumption. The regional aquifer is used for drinking water on site. This water is chlorinated to meet drinking water requirements and is tested regularly. Because San Joaquin County requires an annular seal to extend from ground surface to a depth of 50 feet for agricultural wells and 100 feet for drinking water supply wells, groundwater within 50 feet of the septic systems is not available for agricultural, municipal, or domestic use.

68. The Discharger has not evaluated the potential for domestic wastewater discharges to the septic systems to impact beneficial uses of groundwater. Also, the Discharger does not monitor the groundwater specifically for impact of discharges from septic systems to groundwater; however, groundwater monitoring wells installed for the CERCLA investigations exist in the general vicinity of most of the septic systems. The Discharger monitors for a wide range of constituents associated with the CERCLA project. CERCLA investigations in the areas around Building 812, Building 834, Building 850, and Building 899, have determined that nitrate concentrations in groundwater exceed the drinking water MCL. Investigations in these areas have attributed the source of the nitrate at least in part to the septic systems. This Order requires the Discharger to monitor existing groundwater monitoring wells in the vicinity of these four septic systems as described in the MRP.

69. This Order requires the Discharger to evaluate if groundwater is impacted or may be impacted by the septic systems, as described below in Provision 8. If any septic systems have degraded groundwater, the Discharger will be required to monitor groundwater up and downgradient of those septic systems and to submit a feasibility study proposing remedial alternatives to restore beneficial uses of groundwater if it is determined by the Regional Water Board that the groundwater has been unreasonably degraded. The Discharger shall include a proposal for implementing a source control program and BPT to reduce pollutants in the discharge.

Low Threat Discharges

70. The Discharger conducts a variety of activities at Site 300 that may result in low volume and low-threat discharges. Consistent with the Storm Water Pollution Prevention Program, the discharger has implemented Best Management Practices (BMPs) to prevent these discharges from reaching surface water drainage courses, thus these discharges percolate into the ground. The discharges detailed in Attachment 4 are primarily composed of potable water, low conductivity water, condensate, and uncontaminated contained rainwater. These discharges may occur at any of the facilities and outdoor areas at Site 300.

71. The Discharger evaluated the low threat discharges in a technical report submitted in 1994. These discharges did not contain any constituents that would negatively affect groundwater and are discharged in low volumes, ranging from drips of condensate to one time 5,000-gallon discharges of water that percolate into the ground. (see Attachment 4)

72. The Discharger has obtained coverage under the Central Valley General Order No. 5-00-175, NPDES Permit CAG995001 the *General Order for Dewatering and Other Low Threat Discharges to Surface Waters*, for large volume potable water discharges that have the potential to reach surface waters.

BASIN PLAN, BENEFICIAL USES, AND REGULATORY CONSIDERATIONS

73. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition, (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board (State Water Board). Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.

74. The Basin Plan designates the beneficial uses of ground water underlying Site 300 as municipal and domestic, agricultural, and industrial supply.

75. The Basin Plan establishes numerical and narrative water quality objectives for surface and groundwater within the basin, and recognizes that water quality objectives are achieved primarily through the Regional Water Board's adoption of waste discharge requirements and enforcement orders. Where numerical water quality objectives are listed, these are limits necessary for the reasonable protection of beneficial uses of the water. Where compliance with narrative water quality objectives is required, the Regional Water Board

will, on a case-by-case basis, adopt numerical limitations in orders, which will implement the narrative objectives to protect beneficial uses of the waters of the state.

76. The Basin Plan identifies numerical water quality objectives for waters designated as municipal supply. These are the MCLs specified in the following provisions of Title 22, California Code of Regulations: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (Secondary MCLs-Consumer Acceptance Limits) of Section 64449. The Basin Plan's incorporation of these provisions by reference is prospective, and includes future changes to the incorporated provisions as the changes take effect. The Basin Plan recognizes that the Regional Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

77. The Basin Plan contains narrative water quality objectives for chemical constituents, tastes and odors, and toxicity. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants or animals. The chemical constituent objective requires that groundwater shall not contain chemical constituents in concentrations that adversely affect beneficial uses. The taste and odor objectives require that groundwater shall not contain tastes or odors producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

78. The Basin Plan establishes the control of salinity as a high priority. The Regional Water Board issued a memorandum on 26 April 2007 setting forth guidance for the consistent management of salinity and the need to immediately begin addressing salinity in existing discharges. The discharge of salts above background levels, when discharged to land or water, increases the inventory of salt in the Region, that is, it increases the total salt contained in surface water, groundwater, and soil. Crop productivity drops with increasing soil salinity until farming becomes infeasible. Some types of salt can result in significant human health risks. For example, nitrates are a component of salt and pose a significant human health risk. This Order complies with the 26 April 2007 guidance memorandum. Salinity is of concern in the existing discharges covered by this Order. However, sufficient information is not available at this time to establish effluent limits or interim effluent limits. This Order requires the Discharger to conduct a salinity evaluation and minimization plan; requires the Discharger to obtain additional effluent information; requires the Discharger to evaluate fate and transport of salt to ground water; and requires the Discharger to develop additional information on salinity in the source water and receiving water.

79. Section 13241 of the Water Code requires the Regional Water Board to consider various factors, including economic considerations, when adopting water quality objectives into its Basin Plan. Water Code Section 13263 requires the Regional Water Board to address the factors in Section 13241 in adopting waste discharge requirements. The State Water Board, however, has held that a regional water board need not specifically address the Section 13241 factors when implementing existing water quality objectives in waste discharge requirements because the factors were already considered in adopting water quality objectives. These waste discharge requirements implement adopted water quality objectives. Therefore, no additional analysis of Section 13241 factors is required.

80. The US EPA has promulgated biosolids reuse regulations in 40 CFR 503, Standard for the Use or Disposal of Sewage Sludge, which establishes management criteria for protection of ground and surface waters, sets application rates for heavy metals, and establishes stabilization and disinfection criteria.

81. The Regional Water Board is using the Standards in 40 CFR 503 as guidelines in establishing this Order, but the Regional Water Board is not the implementing agency for 40 CFR 503 regulations. The Discharger may have separate and/or additional compliance, reporting, and permitting responsibilities to the US EPA.

82. The action to revise the WDR for the sewage evaporation and percolation ponds, septic systems, low-threat discharges, mechanical equipment wastewater, and cooling tower discharges is exempt from provisions of the California Environmental Quality Act (Pub. Resources Code § 21000, et seq.) in accordance with CCR, Title 14, Section 15301 for existing facilities.

83. State Board Resolution No. 68-16 (Resolution 68-16) requires the Regional Water Board, in regulating the discharge of waste, to maintain high quality waters of the State until it is demonstrated that any change in water quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the State Water Board's policies (e.g., quality that exceeds water quality objectives). The Regional Water Board finds that the discharge, as allowed in these waste discharge requirements, is consistent with Resolution No. 68-16 since: (1) this Order requires use of best practicable treatment, including adequate monitoring and contingency plans to assure protection of water quality, and (2) this Order does not allow discharges of waste to degrade water quality below background levels, and, where background levels have already been degraded, this Order prohibits any further degradation. If the discharge causes or threatens to cause degradation of water quality to levels that exceed water quality objectives,

then the Discharger will be required to cease the discharge, implement source control, change the method of disposal, or take other action. Some localized degradation of groundwater beneath septic systems is indicated in investigations of groundwater quality conducted as part of the CERCLA remedial investigations. Additional monitoring may be necessary to determine if degradation threatens beneficial uses. If beneficial uses are being impacted, the Discharger will need to implement source control for constituents that impact beneficial uses and may be required to undertake remedial actions.

84. Section 13267(b) of the California Water Code provides that: "In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports".

85. The technical reports required by this Order and by MRP No. R5-2008-XXXX are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the waste subject to this Order.

86. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as described in California Well Standards Bulletin 74-90 (June 1991) and Water Well Standards: State of California Bulletin 94-81 (December 1981). These standards, and any more stringent standards adopted by the State or county pursuant to CWC Section 13801, apply to all monitoring wells.

87. The discharges to ground and into the sewage ponds, septic systems, and percolation pits are exempt from the requirements of Title 27. The exemption is based on the following:

a) The Regional Water Board is issuing waste discharge requirements,
b) The discharge complies with the Basin Plan, and

c) The wastewater does not need to be managed according to 22 CCR, Division 4, Chapter 30, as a hazardous waste.

88. State regulations that prescribe procedures for detecting and characterizing the impact of waste constituents from waste management units on groundwater are found in Title 27. While the wastewater treatment facility is exempt from Title 27, the data analysis methods of Title 27 are appropriate for determining whether the discharge complies with the terms for protection of groundwater specified in this Order.

89. Pursuant to California Water Code Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

90. The Regional Water Board considered all the above and the supplemental information and details in the attached Information Sheet, a part of this Order, in establishing the following conditions of discharge.

91. The Regional Water Board has notified the Discharger and interested agencies and persons of its intention to revise the waste discharge requirements for this facility and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

92. In a public hearing, the Regional Water Board heard and considered all comments pertaining to this facility and discharges that fall under these requirements.

IT IS HEREBY ORDERED that Order No. 96-248, is rescinded and Lawrence Livermore National Security, LLC, and the U.S. Department of Energy, their agents, successors, and assigns, in order to meet provisions of Division 7 of the Water Code and the regulations adopted thereunder, shall comply with the following:

[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached “Standard Provisions and Reporting Requirements for Waste Discharge Requirements” dated September 2003.

A. DISCHARGE PROHIBITIONS:

1. Discharge of waste to surface waters or to surface water drainage courses is prohibited.

2. The bypass or overflow of untreated or partially treated waste is prohibited except for the overflow from the sewage evaporation pond to the percolation pond during periods of heavy rainfall and occasional bypass of the percolation pits when they undergo maintenance.

3. Discharges not listed on Attachment 4 or in the Findings are prohibited unless the Regional Water Board has otherwise permitted or granted a waiver for the discharge.

4. Discharge of waste classified as hazardous, as defined in Sections 2521(a) of the California Code of Regulations (CCR), Title 23, Chapter 15 (hereafter Chapter 15), or designated, as defined in Section 13173 of the California Water Code (CWC), to the sewage ponds, percolation pits, septic systems, or ground, is prohibited.

5. Neither the treatment nor the discharges shall cause a pollution or nuisance as defined by the CWC, Section 13050.

6. The discharges shall not adversely impact the beneficial uses of groundwater.

B. DISCHARGE SPECIFICATIONS:

1. The discharges shall remain within the designated disposal areas at all times.

2. The sewage ponds shall be managed to prevent breeding of mosquitoes. In particular,

   a) An erosion control program must be implemented to assure that small coves and irregularities are not created around the perimeter of the water surface.

   b) Weeds shall be minimized through control of water depth, harvesting, or herbicides.

   c) Dead algae, vegetation, and debris shall not accumulate on the water surface.

3. Objectionable odors originating at the sewage ponds shall not be perceivable beyond the limits of the property owned by the Discharger.

4. As a means of discerning compliance with discharge specification No. 3, the dissolved oxygen content in the upper one-foot of the sewage evaporation pond shall not be less than 1.0 mg/L for 16 hours in any 24 hour period.

5. Public contact with wastewater shall be precluded through such means as fences, signs, and other acceptable alternatives.

6. The Discharger shall implement the BMPs for low threat discharges identified in Attachment 4.

7. Adequate freeboard must be maintained in the sewage evaporation pond to prevent over-topping or erosion of the pond embankment which may threaten the integrity of the pond.

8. When discharge to a percolation pit is diverted during maintenance activities, the Discharger shall prevent the discharge from entering any surface water drainage courses.

9. Discharges to the sewage ponds and the percolation pits shall not have a pH less than 5.0 or greater than 10.0.

C. SCREENINGS, SLUDGES, AND SOLIDS MANAGEMENT AT THE SEWAGE PONDS

1. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner that is consistent with CCR Title 27, Division 2, Section 20220(c) and Title 23, Division 3, Chapter 15 and approved by the Executive Officer.

2. Any proposed change in sludge use or disposal practice from a previously approved practice shall be reported to the Executive Officer at least 90 days in advance of the change.

3. Use and disposal of sewage sludge shall comply with existing Federal and State laws and regulations, including permitting requirements and technical standards included in 40 CFR 503.

4. If the State Water Board and the Regional Water Boards are given the authority to implement regulations contained in 40 CFR 503, this Order may be reopened to incorporate appropriate time schedules and technical standards. The Discharger must comply with the standards and time schedules contained in 40 CFR 503 whether or not they have been incorporated into this Order.

5. The Discharger shall submit an annual report describing the quantity of sludge removed from wastewater management units and the manner and location of disposal. This report is not required in years when no screenings, sludge, or solids have been removed.

D. GROUND WATER LIMITATIONS

The discharge shall not cause underlying groundwater to:

1. Contain waste constituents in concentrations statistically greater than background water quality. If background quality has been degraded in the past, the discharges covered in this Order shall not further degrade groundwater. Groundwater background quality varies across the site and among the various stratigraphic units. The methods for determining background are described in the MRP

2. Contain chemicals, metals, or trace elements in concentrations that adversely affect beneficial uses or exceed MCLs specified in 22 CCR, Division 4, Chapter 15. If MCLs are exceeded due to natural background or degradation from past discharges, the discharges covered in this Order shall not further degrade groundwater.

3. Exceed a most probable number of fecal coliform organisms of 2.2/100 ml over two consecutive quarters.

4. Exceed concentrations of radionuclides specified in 22 CCR, Division 4, Chapter 15.

5. Contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

6. Groundwater shall not be impacted with nitrate so that the concentrations are greater than the MCL or background water quality when background concentrations exceed the MCL. Where groundwater is already degraded with nitrate from past discharges, the discharges covered in this Order shall not further degrade groundwater.

E. PROVISIONS

1. The Discharger shall notify the Regional Board **30 days** prior to installing or enlarging septic systems or percolation pits to receive domestic wastewater, mechanical equipment wastewater, or cooling tower blowdown discharges. If the installation or enlargement of a septic system or percolation pit is to accommodate a new discharge location or a change in discharge water quality or quantity, the Discharger must submit a new report of waste discharge (RWD) which includes an evaluation of any potential impact to groundwater quality posed by the waste stream. The new discharge shall not occur until this Order is revised in response to the RWD.

2. The Discharger shall submit an RWD to the Regional Water Board in advance of discharging any new mechanical equipment waste stream or cooling tower waste stream to a septic system. The RWD shall include an evaluation of any potential impact to groundwater quality posed by the waste stream. The new discharge shall not occur until this Order is revised in response to the RWD.

3. By **1 March 2010** the Discharger shall prepare a final salinity evaluation and minimization plan to address the sources of salinity in cooling tower and mechanical equipment effluent. The evaluation and minimization plan shall include:
   a) Identification of the sources or potential sources of salinity in cooling tower and mechanical equipment effluent and an estimate of the contributions of salinity from these sources.
   b) An estimate of potential reductions that may be attained through controllable sources.
   c) A description of the tasks, costs and time required to investigate and to implement the source reduction elements of the minimization plan.
   d) An analysis, to the extent feasible, of any adverse environmental impacts, including the impact to water conservation, that may result from the implementation of the salinity minimization program.
   e) Progress to date in reducing the concentration and/or mass of salinity in the effluent.

4. The Discharger shall include progress reports on the salinity evaluation and minimization plan in the semi annual monitoring reports.

5. By **1 March 2009** the Discharger shall submit to the Regional Water Board for review and concurrence a work plan to sample effluent to the percolation pits and to model and otherwise evaluate the potential for salts in the mechanical equipment and cooling tower effluent to impact groundwater beneficial uses. In addition, the work plan will identify monitoring wells that can be used to determine background concentrations for salts in groundwater and monitoring wells that could be used to monitor groundwater downgradient of the percolation pits. The work plan shall include a schedule for completing the work and submitting the final evaluation, which shall become a part of this Order.

6. If it is determined through monitoring and modeling that the salts in the effluent from cooling towers and mechanical equipment have the potential to impact beneficial uses of groundwater, upon request of the Executive Officer the Discharger shall submit to the Regional Water Board for review and concurrence a work plan to install groundwater monitoring wells to determine if beneficial uses are being impacted. The work plan shall include a schedule for completing the work, which shall become a part of this Order.

7. **One month after receiving the first four consecutive quarters of groundwater monitoring results,** the Discharger shall submit to the Regional Water Board an evaluation of the monitoring. If the monitoring shows that the beneficial uses of groundwater have been impacted by percolation pit discharges, upon request of the Executive Officer the Discharger must submit a feasibility study proposing remedial alternatives to restore beneficial uses to the groundwater. The feasibility study shall include a schedule for completing the work, which shall become a part of this Order. The Discharger must include a proposal for implementing a source control program and best practicable technology (BPT) to reduce pollutants in the discharge. The Regional Water Board may reopen this Order to include additional requirements resulting from the above submitted studies.

8. By **1 March 2009**, the Discharger shall submit to the Regional Water Board a work plan for review and concurrence to evaluate the impacts or potential impacts to groundwater by Site 300 septic systems. The evaluation shall be based on the location of each septic system discharge zone (e.g. leachfield), the use of the septic systems, depths to groundwater, geology below the systems, monitoring wells in the vicinity of the system including monitoring wells potentially upgradient and downgradient of the discharge zone, and any available data on groundwater and effluent quality. The evaluation shall summarize available data for nutrients, fecal and total coliform, trace organics, general minerals or other analyses such as isotopic signatures that may indicate a septic system impact on groundwater. The work plan shall include a schedule for completing the work and submitting the final evaluation, which shall become a part of this Order.

9. If the Regional Water Board determines from review of the evaluation report that the effluent from septic systems poses a threat to groundwater, upon request of the Executive Officer the Discharger shall submit a work plan to the Regional Water Board for review and concurrence to install groundwater monitoring wells to determine if beneficial uses are being impacted. The work plan shall include a schedule for completing the work, which shall become a part of this Order.

10. **One month after receiving the first four consecutive quarters of groundwater monitoring results,** the Discharger shall submit to the Regional Water Board an evaluation of the monitoring. If the monitoring shows that the beneficial uses of groundwater have been impacted by septic system discharges, upon request of the Executive Officer the Discharger shall submit to the Regional Water Board for review and concurrence a feasibility study proposing remedial alternatives to restore beneficial uses to the groundwater. The feasibility study shall include a schedule for completing the work, which shall become a part of this Order. The Discharger shall include a proposal for implementing a source control program and BPT to reduce

pollutants in the discharge. The Regional Water Board may reopen this Order to include additional requirements resulting from the above submitted studies.

11. If the State issues a general permit to control discharges from on-site wastewater treatment systems (e.g. septic systems), this Order may be reopened to incorporate appropriate provisions and technical standards to make the regulation of on-site wastewater treatment systems at Site 300 consistent with the State requirements.

12. The Discharger shall notify Regional Water Board staff at least 30 days in advance of changing chemical additives to cooling tower water used for corrosion and biological control to receive approval from Regional Water Board staff of the change. The notification shall include an evaluation of any potential impact to groundwater quality posed by the use of the new treatments.

13. The Discharger shall notify Regional Water Board staff at least 30 days in advance of any proposed changes to the processes or mechanical equipment which may affect mechanical equipment discharge quality. The notification shall include an evaluation of any potential impact to groundwater quality posed by the changes.

14. The Discharger shall notify the Regional Water Board of plans to close a waste management unit and submit a closure plan 45 days prior to closure. Field activities for closure shall not take place until the closure plan is approved by Regional Water Board staff.

15. The Discharger shall notify the Regional Water Board of any overflow from a mechanical equipment or cooling tower percolation pit within 2 days of the overflow. Notification shall include a description of the affected area, the cause of the overflow, containment methods and a plan to assure that overflow will not occur in the future.

16. The Discharger shall notify the Regional Water Board within 24-hours of any overflow from mechanical equipment or cooling tower percolation pits that reaches a surface water drainage course. Notification shall include a description of the affected area, the cause of the overflow, containment methods and a plan to assure that overflow will not occur in the future.

17. The Discharger shall comply with the Monitoring and Reporting Program No. R5-2008-XXXX, a part of this Order, and any revisions thereto as ordered by the Executive Officer.

18. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated September 2003, a

part of this Order. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)".

19. In the event of any change in control or ownership of land or waste discharge facilities described herein, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Regional Water Board.

20. The Discharger shall comply with all applicable provisions of Title 27 and 40 CFR Part 258 that are not specifically referenced in this Order.

21. The Regional Water Board will review this Order periodically and will revise requirements when necessary.

22. The Discharger shall maintain a copy of this Order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order issued by the California Regional Water Quality Control Board, Central Valley Region, on _____.

_____
PAMELA C. CREEDON, Executive Officer